## Preface

The author of *Bridge Design Manual* is the Methods Section of the Office of Bridges and Structures.

When complete, *Bridge Design Manual* will replace the policies of the latest hard-copy editions of "Aesthetic Bridge Design Guidelines", "Criteria for Falsework Check", and similar documents. Where production of the manual indicates gaps in existing office policies the manual will include sections for new policies.

Dual unit systems are used throughout the manual, with the exception of the LRFD geotechnical resistance charts [BDM 6.2.7]. Customary U.S. or English unit values are given first, followed by SI or metric unit values in parenthesis.

*Bridge Design Manual* shall be used with other Iowa DOT documents and standards including the latest editions of the Office of Bridges and Structures "Standard Sheets," the Office of Materials "Instructional Memoranda," and *Standard Specifications for Highway and Bridge Construction*. It also shall be used with the 2007 edition of *AASHTO LRFD Bridge Design Specifications* with the latest interims, except as noted, and the 2002 edition of the *AASHTO Standard Specifications for Highway Bridges* with current errata changes. A list of reference documents and standards along with abbreviations is given in the introduction. An additional list is given with each major article or section.

Office of Bridges and Structures documents are available on the office web site:

http://www.iowadot.gov/bridge/index.htm

and Iowa DOT documents are available in the Electronic Reference Library:

http://www.erl.dot.state.ia.us/

There have been changes in the organization and numbering of the 2009 edition of the *Standard Specifications for Highway and Bridge Construction.* All references to the standard specifications have been checked and updated if the numbering of the 2009 article is different from the numbering of the 2001 article.

At this time the office no longer is maintaining the allowable stress design/load factor design (ASD/LFD) manual or the metric standard sheets.

The office began the transition to load and resistance factor design (LRFD) in 2005 based on the *AASHTO LRFD Bridge Design Specifications, Third Edition*. To date the office has issued new LRFD superstructure sections for the manual during 2007 and is issuing new LRFD substructure sections during 2008.

The present bridge and culvert design policy is as follows [OBS MM No. 210, FHWA Memorandum and Attachment].

- All bridge projects started after 1 October 2007 shall have the superstructures designed using the AASHTO LRFD Specifications, 4th Edition/2007.
- With the release of Section 6.6, Piers, of *Bridge Design Manual* the substructure units of bridge projects started after 1 January 2009 shall be designed using the AASHTO LRFD Specifications.
    - The superstructure and substructure for the current J Standards (three-span continuous concrete slab standards) are designed for LRFD and conform to this policy.
    - The superstructure for the H Standards (three span prestressed beam standards) is designed for LRFD, and the substructure is designed for HS25 loading under the AASHTO Standard Specifications. If these H Standards are used, the substructure design will be considered acceptable with no redesign required. The office plans to update the substructure to LRFD in 2009.

    - The superstructure and substructure for the current RS Standards (three span rolled steel beam standards) are designed for HS20 loading under the AASHTO Standard Specifications. These RS Standards have been removed from the Office of Bridges and Structures web site and will not be acceptable for new projects. The office will consider updating these standards to LRFD in the future.
- Exceptions to this LRFD policy will be considered based on development issues associated with the overall project. In general, if preliminary design (completion of the TS&L) was completed prior to October 2007, the AASHTO Standard Specifications may be used in final design.
- Section 6.3, Drilled Shafts, of *Bridge Design Manual* has not been updated to LRFD, and thus drilled shafts should be designed by the AASHTO Standard Specifications until a section updated to LRFD is issued.
- Repairs shall continue to follow guidelines in the repair section [BDM 9.1, OBS MM No. 190].
- Reinforced concrete box culverts and flumes will continue to be designed by the AASHTO Standard Specifications until the culvert and flume standards are updated to LRFD.
- Pile lengths may be designed by the AASHTO Standard Specifications using the Foundation Soils Information Chart or by the AASHTO LRFD Specifications using the charts in 6.2, Piles, in *Bridge Design Manual* [BDM 6.2.7]. The design methods should give similar results for pile lengths. Designers are encouraged to calculate the pile lengths using both methods to check the results.

In general *Bridge Design Manual* is intended to define office practice for typical Iowa bridges without restricting innovation for unusual site and design conditions. The words “shall”, “required”, “office policy”, and similar terms indicate mandatory specifications that need to be followed unless exceptions are approved by the supervising Section Leader. Other terms such as “should”, “prefer”, and “recommended” indicate general guidance subject to engineering judgment of the designer. Interpretations of the supervising Section Leader, the Chief Structural Engineer, the Assistant Bridge Engineer, and the Bridge Engineer supersede policies in this manual.

This manual will be supplemented with methods memos that update policies [OBS MM No. 124]. When new memos are approved they will be issued at the beginning of each month through the “Graphicmail” service [OBS MM No. 170]. Once issued, the memos will be available on the office web site.

http://www.iowadot.gov/bridge/mthdmemo.htm

As time permits, the Methods Section will revise the manual to include the policy portions of the memos, and the memos will be duplicated in the commentary for the manual. Where a policy-update memo is referenced in the manual the user will find the complete memo or a reference to its location in the corresponding commentary article. Superseded and obsolete memos will be moved to the appropriate commentary appendix.

Revision dates will be given on the footer for each section or article. While the manual is in production there are no plans to issue paper copies or specific editions.

Standard CADD notes are provided in Section 11 at the end of the manual.

*Bridge Design Manual* does not include design procedures, examples, or software. For office use, separate documents and access systems will be developed as design aids.

Users are invited to bring errors and omissions to the attention of the Methods Section of the Office of Bridges and Structures.

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